

IN THE CLAIMS:

1. (Currently amended) An optical sensor for monitoring combustion processes in a combustion chamber, comprising:

a lens system (1, 2) facing the combustion chamber,

a waveguide [(5)] and

a sheath [(4)] surrounding the lens system and one end of the waveguide,

wherein the lens system (1, 2) comprises at least one essentially plano-concave lens [(1)] and a double concave lens [(2)] wherein the planar face of the plano-concave lens [(1)] is exposed to the combustion chamber.

2. (Currently amended) A sensor according to claim 1 wherein the angular coverage of the lens system (1, 2) is at least in a range of 130° up to 140°.

3. (Currently amended) A sensor according to claim 1 wherein the lenses (1, 2) are composed of sapphire or quartz glass.

4. (Currently amended) A sensor according to claim 1 wherein at least the plano-concave lens [(1)] at its surface area is surrounded by a metal plating.

5. (Currently amended) A sensor according to claim 4 wherein the plano-concave lens [(1)] is fixed to the sheath [(4)] by means of a soldering material.

6. (Currently amended) A sensor according to claim 1 wherein the lens system (1, 2) has a maximum diameter of < 8 mm.

7. (Currently amended) A sensor according to claim 1 wherein the length of the lens system (1, 2) which has to be passed by the light is at most equal to the diameter of the lens system (1, 2).

8. (Currently amended) A sensor according to claim 1 wherein the outer diameter of the sheath $[(4)]$ is at most 10 mm.

9. (Previously presented) A sensor according to claim 1 wherein the sensor can be assembled in a spark plug or in a heater plug.

10. (Currently amended) A sensor according to claim 1 wherein the slackness $[(3)]$ between the outer radius of the lenses $(1,2)$ and the inner radius of the sheath $[(4)]$ is less than 10 μm .

11. (Currently amended) A sensor according to claim 3 wherein at least the lens $[(1)]$ facing the combustion chamber is fixed by means of a soldering material to the sheath $[(4)]$.

12. (Currently amended) A sensor according to claim 1 wherein the sheath $[(4)]$ is made of a material able to withstand a continuous temperature load of 600°C and a momentary temperature load of 950°C.

13. (Currently amended) A sensor according to claim 1 wherein the sheath $[(4)]$ is made of a material having a coefficient of thermal expansion in the range of 0 to 400°C of less than $10.5 \cdot 10^{-6} \text{ K}^{-1}$.

14. (Currently amended) A method for the centering of one or more lenses $(1,2)$ and a waveguide $[(5)]$ in a sheath $[(4)]$ of an optical sensor for the monitoring of combustion processes in a combustion chamber, said sensor comprising a lens system having at least two lenses, wherein the gap $[(3)]$ between the outer radius of the lenses $(1,2)$ and the inner radius of the sheath $[(4)]$ is less than 10 μm , and that the gap $[(3)]$ is filled with a soldering paste and that the deviation of the axial orientation of the waveguide $[(5)]$ and the lens system $(1,2)$ is less than 10 μm .

15. (Currently amended) The method according to claim 14 wherein a deep-drawn sheath $[(4)]$ is used.

16. (Cancelled)

17. (Currently amended) The method according to claim 14, wherein the sensor consists of at least a lens system $\{1, 2\}$ facing the combustion chamber, a waveguide $[(5)]$ and a sheath $[(4)]$ surrounding the lens system and one end of the waveguide wherein the lens system $\{1, 2\}$ comprises at least one essentially plano-concave lens $[(1)]$ and a double concave lens $[(2)]$ and wherein the planar face of the plano-concave lens $[(1)]$ is exposed to the combustion chamber.

18.- 20. (Cancelled).

21. (Currently amended) The method according to claim 17, wherein the plano-concave lens $[(1)]$ is fixed to the sheath $[(4)]$ by means of a soldering material.

22.-24. (Cancelled).

25. (Previously presented) The method according to claim 17, wherein the sensor can be assembled in a spark plug or in a heater plug.

26. (Cancelled).

27. (Currently amended) The method according to claim 14, wherein at least the lens $[(1)]$ facing the combustion chamber is fixed by means of a soldering material to the sheath $[(4)]$ in the area of the gap $[(3)]$.

28.-29. (Cancelled).